

WHAT IS CLAIMED IS:

1. A probe card electrically coupled to a plurality of contact terminals provided on a circuit under test for performing signal transmission between said circuit under test and an external semiconductor testing equipment, comprising:
 - a substrate;
 - a plurality of signal transmission paths formed on said substrate; and
 - a plurality of contactors formed on ends of said plurality of signal transmission paths on one side of said substrate, wherein said plurality of contactors are made of an amorphous material comprising a supercooled liquid phase region and contacted to said contact terminals provided on said circuit under test.
2. A probe card as claimed in claim 1, wherein said contactor is formed to be separated from said substrate.
3. A probe card as claimed in claim 1 or claim 2, wherein said contactor is extended to a predetermined direction from a surface of said substrate.
4. A probe card as claimed in any one of claims 1 to 3, wherein said contactor has a vertical elasticity against a surface of said substrate.
5. A probe card as claimed in any one of claims 1 to 4, wherein at least a portion of said signal transmission path near said end of it is made of the same amorphous material used for said contactor.
6. A probe card as claimed in any one of claims 1 to 5 further comprising a grounding line, which is grounded, formed to be apart from and in parallel to said signal transmission path.

7. A probe card as claimed in any one of claims 1 to 6 further comprising a low-resistance unit having lower resistance than that of said signal transmission path, said low-resistance unit being formed near said signal transmission path.

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8. A probe card as claimed in any one of claims 1 to 7, wherein said contactor comprises a contacting point made of a contact-point material on an end of it.

10 9. A probe card as claimed in any one of claims 1 to 8, wherein said contactor is coated with a metal material.

10. A probe card as claimed in any one of claims 1 to 9 further comprising a voltage providing unit for providing a predetermined
15 voltage, said voltage providing unit being provided on a backside of said one side of said substrate.

11. A probe card as claimed in claim 10, wherein said voltage providing unit is formed on an area other than areas of said backside
20 of said substrate corresponding to areas of said one side of said substrate where said contactors are formed.

12. A probe card as claimed in claim 10, wherein
said substrate is made of a dielectric material or a
25 semiconductor material,
said signal transmission path, said substrate and said voltage providing unit form a microstrip line having a predetermined characteristic impedance.

30 13. A probe card as claimed in any one of claims 1 to 12 further comprising a plurality of contactors made of an amorphous material having a supercooled liquid phase region, wherein said plurality of contactors are electrically coupled to said contactors formed on said one side of said substrate through said signal transmission

paths and formed on said backside of said substrate.

14. A method for forming a contactor on a substrate of a probe card electrically coupled to a plurality of contact terminals provided on a circuit under test for performing signal transmission between said circuit under test and an external semiconductor testing equipment, said contactor contacting to said contact terminal, comprising steps of:

forming a sacrificial layer on a predetermined area of said substrate;

forming an amorphous material layer comprising an amorphous material having a supercooled liquid phase region on said sacrificial layer and said substrate;

forming a cantilever of an amorphous material comprising a free unit as a portion of it by removing said sacrificial layer between a portion of said amorphous material layer and said substrate, said free unit being separated from said substrate; and

forming said contactor by bending said free unit toward a predetermined direction from said substrate.

15. A method for forming a contactor on a substrate of a probe card electrically coupled to a plurality of contact terminals provided on a circuit under test for performing signal transmission between said circuit under test and an external semiconductor testing equipment, said contactor contacting to said contact terminal, comprising steps of:

forming an amorphous material layer comprising an amorphous material having a supercooled liquid phase region on said substrate;

forming a free unit on a portion of said amorphous material layer by removing a portion of said substrate under said portion of said amorphous material layer, said free unit being separated from said substrate; and

forming said contactor by bending said free unit toward a predetermined direction from said substrate.

16. A method for forming a contactor as claimed in claim 14 or
5 claim 15, wherein said amorphous material layer is formed by sputtering said amorphous material.

17. A method for forming a contactor as claimed in any one of claims
14 to 16, wherein said step for forming said contactor comprises
10 a step for causing a plastic deformation of said free unit toward a predetermined direction from said substrate.

18. A method for forming a contactor as claimed in any one of claims
14 to 17, wherein said step for forming said contactor comprises
15 a step for heating said free unit.

19. A method for forming a contactor as claimed in any one of claims
14 to 18, wherein said step for forming said contactor comprises
a step for providing a bending adjustor at a predetermined position
20 toward a direction of gravity from said surface of said substrate.

20. A method for forming a contactor as claimed in claim 19, wherein
said step for forming said contactor comprises a step for providing
a quartz glass substrate comprising a position determining unit
25 for determining said predetermined position toward a direction of gravity from said surface of said substrate.

21. A method for forming a contactor as claimed in any one of claims
14 to 18, wherein said step for forming said contactor comprises
30 a step for providing a bending adjusting member comprising an engaging unit for suppressing movement of said substrate in a direction of gravity and a bending adjustor for determining said predetermined position toward a direction of gravity from said surface of said substrate.

22. A semiconductor chip comprising:

a plurality of pads; and

a plurality of contactors made of an amorphous material

5 having a supercooled liquid phase region on said plurality of pads,
wherein said contactor is extended to a predetermined
direction from a surface of said pads.

23. A semiconductor device comprising a semiconductor chip having

10 a plurality of pads, comprising:

a plurality of electrode leads; and

a package which packs said semiconductor chip,

wherein said pads of said semiconductor chip and said
electrode leads are electrically coupled to each other through
15 contactors made of an amorphous material having a supercooled
liquid phase region.

24. A semiconductor device comprising a semiconductor chip having
a plurality of pads, comprising:

20 a plurality of external terminal balls; and

a package which packs said semiconductor chip,

wherein said pads of said semiconductor chip and said
external terminal balls are electrically coupled to each other
through contactors made of an amorphous material having a
25 supercooled liquid phase region.

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